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THE DISTRIBUTION OF MAN IN RELATION TO THE INVENTION OF FIRE-MAKING METHODS

By WALTER HOUGH

THE following is a discussion of a statement published in the Report of the Congrès International des Americanistes, Quebec, 1906, p. 219,¹ that with the possession of means of making fire at will man could freely leave his early circumscribed seat and successfully spread to other environments and eventually populate the earth. The reverse of this proposition that man, ignorant of the art of making fire, would have remained in a feral state, bound to a particular environment and subjected to the restrictions laid upon the range of the highest organisms, seems also true. For merely theoretical and illustrative purposes the gorilla, an animal held to a very narrow zone on either side of the equator on account of extreme intolerance to temperature changes or dependence on a certain food supply, may be taken as an example of the limitations imposed by nature on other anthropoids. Given hand-cunning, the knowledge of the value of fire, and a method of making it, the gorilla conjecturally might have found means to spread into cooler environments, and this species might have occupied the earth. Man in his original state appears to have been less protected by thickness of skin, hairiness, and other features of robustness than the gorilla; hence, with due regard to our lack of knowledge of man as an animal or a primitive being, he would seem to have been a creature of more restricted environment than the chief primates. It is, however, necessary in the state of our present information to begin with man as a sentient being, armed with a knowledge of fire as it existed in nature, to have completed the acquirement of fire for his personal uses and to have arrived at some method of making fire artificially. We only know of man at the latter stage, and deduce from survivals

¹ Hough, Walter, *The Palm and Agave as Culture Plants*, op. cit.

the existence of former stages. We know also that in these periods of synthesis man had attached to himself the one manifestation of force that was fundamental, that articulated him to physical nature and opened a field of incalculable progress. No stimulus to man's advancement ever approached that given by the acquisition of fire. Fire, however, was not an unmixed blessing, it was a willing slave, but exacting master, its care was most burdensome and of necessity forced on organization for its maintenance and protection; perhaps the most primitive office was that of fire-keeper.

It may here be advanced with some degree of plausibility that man's apparent nakedness and helplessness was largely brought about by the use of fire. Clearly no civilizing influence is greater and much of man's physical modification is doubtless due to the cultural structures growing out of the utilization of fire and the reciprocal and cumulative effect on habits of life moulded by relationship to fire. Movements of man from a primal seat, theoretically tropical, without fire appear inconceivable. Food is the dominating condition of environment, vegetal food the basis, the versatile primate easily becomes omnivorous.

It seems logical that at an early stage in man's acquaintance with fire the effect of heat on food substances would be discovered and the preference for cooked food would arise. Cooking extends the range of the food supply and promotes its preservation for future consumption. That this art increases the probability of a successful migration into unfamiliar terrains is proven in multitudinous instances in historic times.

The distribution of artificial methods of fire-making is very interesting. The Malaysian area is the focus of all methods of fire-making by wood friction. This is especially remarkable since, generally speaking in the Western Hemisphere, Africa, Australia, the black islands, High Asia, only the firedrill, "fire borer," was known. In Malaysia the fire-saw, fire-thong, firedrill, and fire-plow, in fact all the type methods are found. Even the anomalous quartz or pottery and bamboo strike-a-light and the fire piston are peculiarly of this region. In parts of the island of Borneo, as has been remarked elsewhere by the writer, four methods have been observed

and in other localities of this region more than one method is presented by the same people. This strange focusing of fire-making methods here means that Malaysia is a center of the invention of primitive fire-making methods or that it is an example of a great intermingling of migrating races, each with its peculiar fire-making devices based on a knowledge of wood friction acquired at an early stage. Acculturation; an idea usually overworked, must also be considered as an agent in disseminating these devices; but at the same time, it must be pointed out that conservation of custom and the religious aspect of customs also have an effect on the fixity of customary actions.

In the consideration of primitive migration we may remark not only on those who traveled, but those who stayed behind. If the possession of one type of fire-making invention may be taken as evidence of racial solidarity, then those who claim as their own the simple two-stick reciprocating fire-drill, spread farthest over the world. To this invention have been added the improvements of the cord, the bow, the whorl, and in one instance the wheel and cog. This invention also is known to have been superseded by the flint and steel, and has survived into civilization through the conservation of religion or folk custom. Those who stayed behind had the fire-plow, the fire-saw, and the thong-saw, but less than two millenniums ago the people of the fire-plow spread over innumerable islands almost across the vast Pacific. The races who possess the fire-saw have remained confined chiefly to the Malaysian area and those who use the thong-saw are limited to a portion of the Island of Borneo. The most interesting condensation and diffusion zone in the world, the veritable swarming place of races and inventions, is Malaysia. The last great emergence from this hive appears to have been the Polynesians who, according to Churchill, spread into the Pacific some 2000 years ago.¹ These were people of the fire-plow, who had learned through the use of heat to preserve food stores adequate for long voyages and who carried their culture plants with them. They left indelible traces of words among the dark-skinned peoples

¹ Churchill, William, "The Polynesian Wanderings" (*Carnegie Institution of Washington*, 1911, p. v, preface).

who had emerged previously, the Papuans, Melanesians, Micronesians, and Negritos. Other swarms may be dimly distinguished passing by sea or land to islands, to the peninsulas, and the mainland of Asia, and one swarm may have traversed the continent and crossed to people America, and perhaps the most ancient horde passed to Africa and also left remnants, as the Negritos, scattered widely in other directions.

There may be presented here a suggestive table of migrations from some center, preferably the inner court of Malaysia.

Earliest static period: Blacks isolated and localized as animals.

Earliest migration: Blacks, to islands, Africa, Papua, Australia, and continental fringes.

Early migration: Dark brown, to Melanesia, Micronesia, and continental fringes and peninsulas.

Ancient migration: Yellow-brown, Indonesian to Asia, America, India, Indo-China, etc.

Later migration: Lighter yellow-brown, Malays to Madagascar, Japan, Indo-China, East India Islands, continental peninsulas, and mainland of America (?).

Historic-traditional migration: Brown Polynesians to Pacific Islands, Philippines, etc.

Historic migrations: Mongols, Huns, Goths, Vandals, etc., a vast number.

Individual instances of long and difficult journeys made by men deprived of fire or other aids beyond their natural abilities in woodcraft have little bearing on the collective movements of man. These feats show wonderful resource and excite admiration for qualities that have become submerged as the race advances. Such achievements are common among the uncivilized and must have been common in the early migrations. The mass, however, moves on its food supply and carries its impedimenta of children and gear. It is not to be supposed though that the earliest migrations embraced any considerable number, rather there were tentative dislocations of a few individuals, establishing at a distance a new campfire in response to crowding, which rendered the food supply unequal to the demand. These movements in time brought contacts with others from the pristine source which in turn gave rise to more

extended movements and in larger masses. Thus, it is likely that the currents of migration would sometimes return to the place of origin bringing new experience. The theoretical contacts of primitive man have been excellently presented by Prof. Lester F. Ward and offer an interesting study of the possible social evolution, but these presentations rarely give consideration of the fundamental domination of fire on social structures. The procuring, preparation, and preservation of food, transportation by land and water, and to some extent shelter are essentials to migration irrespective of environment, but give rise to arts which are largely reflexes of environment. The use of fire has a tendency to render all environments uniform as to many essentials. Food has been mentioned and it may be perceived that in the procuring and shaping of masses of wood for boat building and for other purposes, fire plays an important role.

It may be presumed that migration by land preceded movements by water, since experiments in flotation beginning with swimming would require a long time before the evolution of boats, which would first be suitable for rivers and with greater knowledge on the part of man be made capable of taking ocean voyages. The conquest of the hydrosphere by means of boats is now seen to have been analogous to the conquest of the atmosphere by balloons and aeroplanes. Thus extensive oversea migrations are later than land migrations and the western hemisphere would be populated from Asia long before Polynesia, and other sea migration, granting that migrants could have crossed the great reach of over 2,000 miles between Easter island and Peru.

It is easy for peoples possessing an art to affirm by a simple effort of reasoning that at a former time they did not possess this art. This statement is common among uncivilized men in regard to fire; hence, caution must be exercised lest it be taken for a transmission of a memory of such a time. Especially is this so because the acquisition of fire by man reverts to such a remote antiquity that no transmission of the experience seems humanly possible. It is observed that the most primitive tribes contemplate the past and fill it with myths of cruder conditions. At what period of advancement man looks to the future it is difficult to say, but the grade of

culture would be high. For a long period the past was regarded as a golden age, an epoch of communication with the gods and at the close of this period comes a severe philosophy that regulates the past on terms of evolution from simple to complex and looks to the future as a logical field for advances. The savage and uncivilized tend to be static and their education is only effected by contact, migration, admixture, and stress of environment, bringing into play dormant faculties of invention and adaptation.

Perhaps migration began with the necessity for following seasonal changes of the food supply, or unusual dislocations of this supply by drought, storm, plant diseases, or other natural causes. These causes as well as cataclysms have been known to influence the movement of peoples, and their natural or enforced migrations might well have produced a limited distribution of peoples before the use of fire. These migrations in the twilight zone when primitive man was still in the grasp of nature offer a legitimate field for the exercise of the scientific imagination, but a more definite starting point is with man in possession of the primal fire. The object of this paper is to suggest that migration was vitally influenced not so much by the utilization of fire, which might tend to induce a static condition, but rather that the invention of fire-making at will powerfully accelerated the voluntary distribution of man over the earth.

Dr. Richard L. Garner, whose acquaintance with the anthropoids is second to that of no other man, informs me that the gorilla, in a state of nature, lives on sour and bitter foods, rejecting sweets. Dr. Garner has superintended the education of a gorilla and observed the acquisition by the animal of a taste for sweets and cooked food, both animal and vegetal, with a final rejection of raw food on the part of the animal. He has also observed that this change of habits apparently produces a change in the disposition of the animal which manifests itself in an amelioration of its disposition and a quickening of its intelligence.

There is no disposition to regard the gorilla as a basis for theories as to the state of primitive man since this animal represents another development and does not stand in the line of the evolution of man. Clues, however, may be derived from a study of his habits as to the

state of primitive man who differs from the gorilla or from any of the anthropoids not only in genealogy and physical development but especially in the possession of a receptive and plastic mind reacting on capable hands and other moving powers.

It will be seen therefore from knowledge derived from a study of animals that the genus *homo* is very mutable and the difficulties that present themselves in regard to the classification of races which give rise to so many divisions of man grow out of endless mutations. It is known also from the study of animals that races readily form or form anew and that under given conditions a race resumes its purity. This constant flux and reflux accounts for any number of changes from a primitive ancestor to the races of today and it appears as a corollary that there is a greater fixity of inventions of man than of man himself. Inventions like that of fire-making would seem therefore to preserve a stricter lineage than social groups of man. It may be said also that inventions that deal with exterior nature are more fixed than those connected with man's physical structure as language, or artificial physical modifications such as deformities for ornament and other purposes. It will be seen also that the acquirement of fire inaugurates the science of cultural anthropology, that vast complex which is the record of man's material activities.

We can affirm in consideration of the foregoing that the invention of fire-making is more radical than any other thing that has happened to man, that it may have accelerated the mutations he has undergone, and without this invention his extended migration over the earth as well as his advancement would have been well nigh impossible.

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